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(54) HEAT RESISTANT DAMPING SHEET

(57)Abstract:
PROBLEM TO BE SOLVED: To demonstrate high performance with good moldability without deteriorating damping performance even when exposed to high temperatures by laminating metal foil of specified thickness on one surface of a damping sheet.
SOLUTION: In a heat resistant damping sheet, metal foil is laminated on one surface of a damping sheet. The metal of the foil includes aluminum, stainless steel, iron, titanium, and various kinds of alloys; however, aluminum is preferable in view of moldability, rigidity, availability, and prices. The thickness of the foil is made 10-100μm. When the thickness exceeds the range, although adequate effects of the metal foil lamination including the retention of good performance by controlling the decrease in the elastic modulus of the damping sheet even when exposed to high temperatures, the moldability such as cutting is deteriorated. Besides, when the thickness is below the range, in spite of the improvement in the moldability, adequate effects of the metal foil lamination can not be obtained.

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CLAIMS

[Claim(s)]
[Claim 1] The heat-resistant vibration-deadening sheet characterized by the thing of a vibration-deadening sheet done to the front face for the laminating of metal Tomari on the other hand.
[Claim 2] The heat-resistant vibration-deadening sheet according to claim 1 characterized by a metallic foil being aluminum foil.
[Claim 3] The heat-resistant vibration-deadening sheet according to claim 1 characterized by the thickness of a metallic foil being 10-100 micrometers.
[Claim 4] The heat-resistant vibration-deadening sheet according to claim 1 characterized by the thickness of a vibration-deadening sheet being 0.5-5mm.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the heat-resistant vibration-deadening sheet which the engine performance does not fall but has the outstanding vibration-deadening nature, even when put to the elevated temperature for example, of 60-100-degreeC.
[0002]
[Description of the Prior Art] The vibration-deadening sheet is used in large fields, such as an automobile, a bicycle, interior material and building materials, OA equipment, and a household-electric-appliances device. The part where a vibration-deadening sheet is applied in these fields is the septum of the engine room of an automobile, or is the casing material in a household-electric-appliances device, and is various. [of the temperature at the time of the use in the application part]
[0003] Then, it was used according to Field of application and the application part which are variously different in this way, having chosen the vibration-deadening sheet with which the engine performance which was most excellent at the time of the use is demonstrated.
[0004] However, according to Field of application or an application part, it was very complicated to have manufactured a vibration-deadening sheet for every service temperature of the, also from it being very uneconomical to manufacture moreover even about what has few operating frequency, actually, it is [for a high temperature service, a low temperature service, and ordinary temperature] large, it divided into three classes, and the vibration-deadening sheet was manufactured.
[0005] However, as shown in drawing 2 in the case of the vibration-deadening sheet for ordinary temperature, although the peak of a loss factor is in an ordinary temperature region and the good engine performance was demonstrated, when it was put, for example to the elevated temperature of 60-100-degreeC, the engine performance was low, for example. For this reason, when such a vibration-deadening sheet was applied to the part put to the temperature field from ordinary temperature to an elevated temperature like an automobile, the fault that engine performance sufficient by the pyrosphere was not demonstrated was produced.
[0006] In order to cancel such fault, by carrying out the polymer blend of the resin which has the peak temperature of a loss factor in a pyrosphere to the resin which constitutes the resin matrix of the vibration-deadening sheet concerned, the peak temperature of the loss factor is moved and the vibration-deadening sheet with which vibration-deadening nature also with a good pyrosphere and insulation were demonstrated has also come to be proposed.
[0007] Moreover, synthetic rubber is blended with JP,7-118448,A for which these people applied previously to at least two sorts of resin with which the peak temperature of a loss factor differs, and the vibration-deadening sheet which has the vibration-deadening nature which crossed and was excellent in large temperature fields, such as from a pyrosphere and a low-temperature region from an ordinary temperature region until a pyrosphere, is shown.
[0008] this invention person in for example, the process in which research is wholeheartedly repeated about the improvement of the vibration-deadening nature in a pyrosphere called 60-100-degreeC The width of face of the peak temperature of a loss factor is expanded by carrying out the polymer alloy of the resin of **** plurality till then mentioned above. the vibration-deadening sheet with which the good engine performance was demonstrated by the pyrosphere -- replacing with -- flume float ** of a vibration-deadening sheet which, on the other hand, carries out the laminating of the metallic foil to a front face -- by the simple approach, the performance degradation in a pyrosphere was stopped, it found out that good vibration-deadening nature could be held, and this invention was completed.

[0009] Namely, this invention aims to let the engine performance offer the heat-resistant vibration-deadening sheet which does not fall but has the outstanding vibration-deadening nature, even when put to the elevated temperature for example, of 60-100-degreeC.
[0010]
[Means for Solving the Problem] In order to attain the above-mentioned purpose, invention according to claim 1 made the summary the heat-resistant vibration-deadening sheet characterized by the thing of a vibration-deadening sheet done to the front face for the laminating of metal Tomari on the other hand.
[0011] Invention according to claim 2 made the summary the heat-resistant vibration-deadening sheet characterized by a metallic foil being aluminum foil.
[0012] Invention according to claim 3 made the summary the heat-resistant vibration-deadening sheet characterized by the thickness of a metallic foil being 10-100 micrometers.
[0013] Invention according to claim 4 made the summary the heat-resistant vibration-deadening sheet characterized by the thickness of a vibration-deadening sheet being 0.5-5mm.
[0014]
[Embodiment of the Invention] As for the heat-resistant vibration-deadening sheet of this invention, the laminating of the metallic foil is carried out to the one side front face of a vibration-deadening sheet. What is necessary is not to be limited especially as a vibration-deadening sheet, but just to choose suitably an automobile, building materials, a household-electric-appliances device, etc. so that the engine performance which was most excellent at the time of the use may be demonstrated according to the Field of application and application part.
[0015] Specifically A polyvinyl chloride, polyethylene, polypropylene, an ethylene-vinylacetate copolymer, A polymethyl methacrylate, polyvinylidene fluoride, polyisoprene, Polystyrene and styrene-Butadiene Acrylonitrile, Viscoelasticity giant molecules, such as a styrene acrylonitrile copolymer, and acrylonitrile-butadiene rubber (NBR), A styrene butadiene rubber (SBR), butadiene rubber (BR), natural rubber (NR), In the resin constituent blended combining one sort chosen from rubber, such as polyisoprene rubber (IR), or two sorts or more Or what was filled up with fillers, such as calcium carbonates, such as a mica scale, a piece of glass, glass fiber, a carbon fiber, precipitated calcium carbonate, and whiting, into the resin constituent which carried out the polymer alloy can be mentioned.
[0016] As thickness of this vibration-deadening sheet, 0.5-5mm is desirable. Although the engine performance will become high if the thickness of a sheet becomes thick rather than this range, shaping is difficult, workability, such as cutting, worsens and there is fault of moreover needing a more powerful attachment means also for the attachment to an application part. On the other hand, if the thickness of a sheet becomes thin rather than this range, although it can fabricate easily, sufficient engine performance is no longer obtained.
[0017] The laminating of the metallic foil is carried out to the one side front face of this vibration-deadening sheet. By this, as shown in drawing 1 , the vibration-deadening nature of the vibration-deadening sheet concerned in a pyrosphere called 60-100-degreeC cannot fall easily, and the good engine performance will be demonstrated. Although that reason is not clear, even when a metallic foil is put to the elevated temperature for example, of 60-100-degreeC, it does not soften, but the high elastic modulus is held, the loss modulus of the whole vibration-deadening sheet concerned can also make it hard to fall this to a front face on the other hand by the thing of a sheet to do for a laminating, consequently it is thought that an elevated temperature and the good engine performance are held.
[0018] Aluminum foil, a stainless steel foil, an iron foil, copper foil, a titanium foil, or various alloy foils are known by this metallic foil. Although it can be used with any of these foils, points, such as a moldability, rigidity, an ease of acquisition, and a price, to aluminum foil is desirable.
[0019] As thickness of a metallic foil, 10-100 micrometers is desirable. If the thickness of a metallic foil becomes thick rather than this range, even when put to an elevated temperature, decline in the elastic modulus of the vibration-deadening sheet concerned is suppressed, and although sufficient effectiveness by having carried out the laminating of the metallic foil that the good engine performance is held is acquired, workability, such as cutting, will worsen. On the other hand, if the thickness of a metallic foil becomes thin rather than this range, although workability will improve, sufficient effectiveness by having carried out the laminating of the metallic foil is no longer acquired.
[0020] Moreover, in the heat-resistant vibration-deadening sheet of this invention, the laminating unification of the above-mentioned vibration-deadening sheet and the metallic foil is carried out through calendering, press forming, etc. adhesives, or a binder.
[0021] In addition, although the vibration-deadening nature of the vibration-deadening sheet concerned

cannot fall easily due to a pyrosphere and the good engine performance is demonstrated, since the noise by vibration will also decrease the heat-resistant vibration-deadening sheet of this invention by attenuation of vibration, the heat-resistant vibration-deadening sheet of this invention is demonstrated in this semantics, without also having insulation with vibration-deadening nature and the insulation based on vibration-deadening nature falling by the pyrosphere.
[0022] In addition, a binder layer is prepared in the another side front face which has not carried out the laminating of the metallic foil of a vibration-deadening sheet, and you may enable it to fix to an application part through a binder layer.
[0023]
[Example]
To the example 1 polyvinyl-chloride (average-degree-of-polymerization 800-1300, product made from incorporated company bell steel ****) 100 weight section, 50% of the weight of the mica scale (a KURARAITO mica scale, 60C, Kuraray Make) was added to what added G 2-ethylhexyl phthalate (DOP) at a rate of 40 weight sections, calender shaping was carried out, and the vibration-deadening sheet whose thickness is 2mm was obtained. On the other hand, to the front face, the laminating of the aluminum foil of the obtained damping sheet which is the thickness of 20 micrometers was carried out, and it considered as the test piece on it.
[0024] On the other hand on the front face, the test piece was obtained like the example 1 except [of the vibration-deadening sheet obtained in the example 2 example 1] having carried out the laminating of the aluminum foil with a thickness of 40 micrometers.
[0025] The laminating of nothing was carried out to the vibration-deadening sheet obtained in the example of comparison 1 example 1, but the sheet as it is was used as the test piece.
[0026] The test piece was obtained like the example 1 except having set thickness of the vibration-deadening sheet of example 3 example 1 to 1mm.
[0027] The test piece was obtained like the example 1 except having set thickness of the vibration-deadening sheet of example 4 example 2 to 1mm.
[0028] The test piece was obtained like the example 1 except having set thickness of the vibration-deadening sheet of the example 1 of example of comparison 2 comparison to 1mm.
[0029] The loss factor (eta) in 60-90-degreeC was measured in the above-mentioned examples 1-4 and a list, and the examples 1 and 2 of a comparison were shown in them at drawing 1 . in addition -- while measurement of a loss factor (eta) cuts each above-mentioned test piece in 110mmx15mm magnitude -- one side of each test piece -- a griddle with a thickness of 1mm -- pasting up -- this -- electromagnetism -- it carried out by equipping excitation detection equipment (MT-1, A202, product made from electronic ****, Inc.).
[0030] Moreover, a loss factor (eta) is eta=2D/8.68x2x3.14xf0. It asked. In addition, the inside D of a formula is an attenuance (thing showing how many db(s) attenuation was carried out in 1 second), and f0. Resonance frequency is shown.
[0031] It turns out that the test piece of examples 1-4 with which the laminating of the metallic foil was carried out shows high vibration-deadening nature at each temperature of 60-90-degreeC compared with the test piece of the examples 1 and 2 of a comparison with which the laminating of the metallic foil is not carried out so that clearly from drawing 1 . Moreover, in the test piece of examples 1-4, although the thickness of a vibration-deadening sheet is thick, it turns out that the direction shows the high engine performance. Moreover, although it was thick also about the thickness of a metallic foil, it was checked that the direction shows the high engine performance.
[0032]
[Effect of the Invention] If it is in a heat-resistant vibration-deadening sheet according to claim 1, from the thing of a vibration-deadening sheet done to the front face for the laminating of metal Tomari on the other hand, the vibration-deadening nature of the vibration-deadening sheet concerned in a pyrosphere called 60-100-degreeC cannot fall easily, for example, and the good engine performance is demonstrated.
[0033] While a moldability is good since aluminum foil is used as a metallic foil if it is in a heat-resistant vibration-deadening sheet according to claim 2, the aluminum foil itself can obtain easily, and since it is low cost, the engine-performance improvement by the pyrosphere does not take cost.
[0034] If it is in a heat-resistant vibration-deadening sheet according to claim 3, since the thickness of a metallic foil is 10-100 micrometers, even when put to an elevated temperature, decline in the elastic modulus of the vibration-deadening sheet concerned is suppressed, the good engine performance is held, and, moreover, processing is easy.

[0035] If it is in a heat-resistant vibration-deadening sheet according to claim 4, since the thickness of a vibration-deadening sheet is 0.5-5mm, it has the outstanding vibration-deadening nature and insulation, and, moreover, a moldability and workability are also good.

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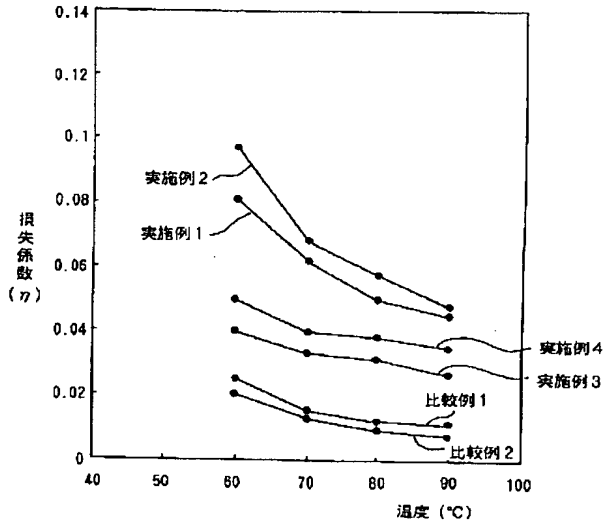
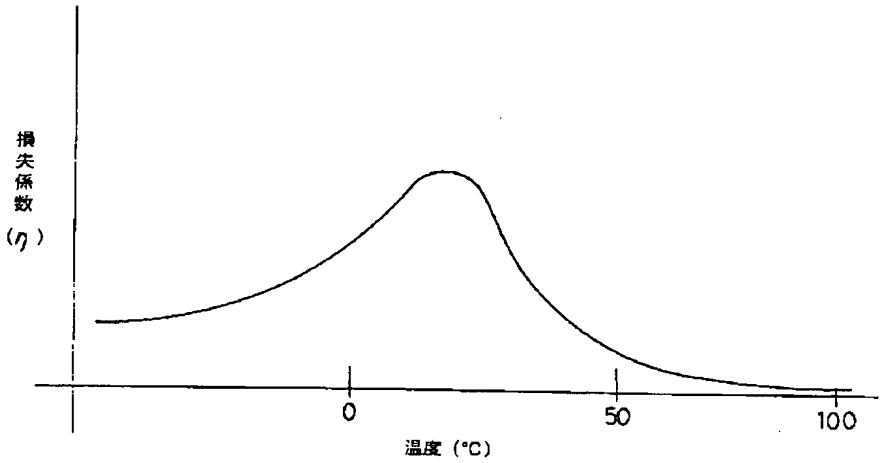
DRAWINGS

[Drawing 1]



[Drawing 2]



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